Amendment to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A method of embedding digital watermark information $b_1 - b_n$ ($2 = n$) in image data, comprising steps of:

dividing the image data into a plurality of areas S each consisting of M × N ($1 = M, N$) pixels;

defining a plurality of areas G each consisting of P × Q ($1 = P, Q$) of the areas S;

allocating each of the areas S constituting each area G to some one of: areas $T_1 - T_n$ which said digital watermark information $b_1 - b_n$, a bit value of the digital watermark information being 0 or 1, is respectively embedded and areas $H_1 - H_m$ ($1 = m$) in which ~~information is not embedded~~ any of bit information 0 and 1 is not embedded;

locating one or more areas T and one or more areas H in a predetermined arrangement in each area G; and

locating the plurality of areas G in a predetermined rule.

2. (currently amended) A method of embedding digital watermark information $b_1 - b_n$ ($2 = n$) in image data comprising steps of:

dividing the image data into a plurality of areas S each consisting of M × N (1

= M, N) pixels;

defining a plurality of areas G each consisting of $P \times Q$ (1 = P, Q) of the areas S;

allocating each of the areas S constituting each area G to some one of: areas T_1 - T_n in which said digital watermark information b_1 - b_n, a bit value of the digital watermark information being 0 or 1, is respectively embedded, areas J_1 - J_k (1 = k) in which information p_1 - p_k (1 = k) specifying an embedding format for embedding said digital watermark information b_1 - b_n in said areas T_1 - T_n, and areas H_1 - H_m (1 = m) in which ~~information is not embedded~~ any of bit information 0 and 1 is not embedded;

locating one or more areas T, one or more areas J, one or more areas H in a predetermined arrangement in each area G; and

locating the plurality of areas G in a predetermined rule.

3. (original) The method of embedding digital watermark information according to Claim 2, wherein:

said digital watermark information b_1 - b_n is embedded by increasing or decreasing pixel data values in the corresponding areas T_1 - T_n according to a bit value (0, 1) of each bit of the digital watermark information b_1 - b_n; and

said information p_1 - p_k specifying said embedding format is embedded such that said information indicates a pattern of respective increasing/decreasing directions in the area T_1 - T_n for a bit value of the digital watermark information, in each area G to which the areas J_1 - J_k embedded with said information p_1 - p_k

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belong.

4. (original) The method of embedding digital watermark information according to Claim 1, wherein:

each of said areas G includes a plurality of said areas H that have been allocated so as to be asymmetric in vertical and horizontal directions in the area G in question.

5. (currently amended) A method of extracting digital watermark information, for extracting the digital watermark information $b_1 - b_n$ (2 = n) , a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising steps of:

dividing the image data into a plurality of areas S each consisting of M × N (1 = M, N) pixels;

detecting areas $H_1 - H_m$ (1 = m) in which ~~information is not embedded~~ any of bit information 0 and 1 is not embedded, from said plurality of areas S; and

recognizing a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out based on locations of said detected areas $H_1 - Hm$ (1 = m) on said image data.

6. (currently amended) A method of extracting digital watermark information, for extracting the digital watermark information $b_1 - b_n$ (2 = n) , a bit value of the

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digital watermark information being 0 or 1, from image data in which said digital

watermark information is embedded, comprising steps of:

dividing the image data into a plurality of areas S each consisting of M × N

(1 = M, N) pixels; detecting areas H_1 - H_m (1 = m) in which ~~information is not~~

~~embedded~~ any of bit information 0 and 1 is not embedded, from said plurality of

areas S;

recognizing a plurality of areas G each consisting of P × Q (1 = P, Q) of the

areas S, said plurality of areas G being located on said image data, and said

recognition being carried out based on locations of said detected areas H_1 - H_m (1 =

m) on said image data;

in each of the plurality of areas G recognized, extracting information p_1 - p_k (1

= k) from areas J_1 - J_k in which said information p_1 - p_k (1 = k) in which said

information p_1 - p_k (1 = k) should be embedded, said information p_1 - p_k specifying

an embedding format for embedding said digital watermark information b_1 - b_n

respectively in said areas T_1 - T_n;

recognizing the embedding format of the digital watermark information b_1 - b_n

in the areas T_1 - T_n in the area G in question; and

extracting the digital watermark information b_1 - b_n from the areas T_1 - T_n,

according to the recognized embedding format.

7. (original) The method of extracting digital watermark Information according

to Claim 6, wherein:

for each of the plurality of groups G recognized, the information p_1 - p_k

embedded in the areas J_1 - J_k is extracted to recognize a pattern of increasing/decreasing directions of pixel data values for a bit value of the digital watermark information, in the area G in question; and

each bit value of the digital watermark information b_1 - b_n embedded in the areas T_1 - T_n is detected according to the recognized pattern of increasing/decreasing directions.

8. (original) The method of extracting digital watermark information according to Claim 5, wherein a plurality of areas H are detected from each of the areas G;

the detected areas H are compared with an embedding pattern for the areas H, said embedding pattern being determined in advance such that the areas H become asymmetric in vertical and horizontal directions in the area G in question; and

contents of image processing carried out on the image data are judged.

9. (currently amended) A program product for making a computer execute a method of embedding digital watermark information b_1 - b_n (2 = n), a bit value of the digital watermark information being 0 or 1, in image data, comprising:

codes for dividing the image data into a plurality of areas S each consisting of M × N (1 = M, N) pixels;

codes for defining a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S;

codes for allocating each of the area S constituting each area G to some one of:

areas T_1 - T_n in which said digital watermark information b_1 -b_n is respectively

embedded and areas H_1 - H_m (1 = m) <u>in which any of bit information 0 and 1 is not</u>

<u>embedded</u><s>in which information is not embedded</s>;

codes for locating one or more areas T and one or more areas H in a predetermined

arrangement in each area G;

codes for locating the plurality of areas G in a predetermined rule; and

a computer readable storage medium for holding the codes.

10. (currently amended) A program product for making a computer execute a

method of embedding digital watermark information b_1 - b_n (2 = n) in image data,

comprising:

codes for dividing the image data into a plurality of areas S each consisting of

M × N (1 = M, N) pixels;

codes for defining a plurality of areas G each consisting of P × Q (1 = P, Q) of

the areas S;

codes for allocating each of the areas S constituting each area G to some one

of; areas T_1 - T_n in which said digital watermark information b_1 - b_n is respectively

embedded, areas J_1 - J_k (1 = k) in which information p_1 - p_k (1 = k) specifying an

embedding format for embedding said digital watermark information b_1 - b_n <u>, a bit</u>

<u>value of the digital watermark information being 0 or 1,</u> in said areas T_1 - T_n, and

areas H_1 - H_m (1 = m) <u>in which any of bit information 0 and 1 is not embedded</u><s>in</s>

<s>which information is not embedded</s>;

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codes for locating one or more areas T, one or more areas J, and one or more

areas H in a predetermined arrangement in each area G;

codes for locating the plurality of areas G in a predetermined rule; and

a computer readable storage medium for holding the codes.

11. (original) The program product according to Claim 10, further comprising:

codes for embedding said digital watermark information b_1 - b_n by increasing

or decreasing pixel data values in the corresponding areas T_1 - T_n according to a bit

value (0, 1) of each bit of the digital watermark information b_1 - b_n; and

codes for embedding said information p_1 - p_k specifying said embedding

format such that said information indicates a pattern of respective

increasing/decreasing directions in the areas T_1 - T_n for a bit value of the digital

watermark information, in each area G to which the areas J_1 - J_k embedded with said

information p_1 - p_k belong.

12. (original) The program product according to Claim 9, wherein:

each of said areas G includes a plurality of said areas H that have been

allocated so as to be asymmetric in vertical and horizontal directions in the area G in

question.

13. (currently amended) A program product for making a computer execute a

method of extracting digital watermark information b_1 - b_n (2 = n), a bit value of the

digital watermark information being 0 or 1, from image data in which said digital

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watermark information is embedded, comprising:

codes for dividing the image data into a plurality of areas S each consisting of M × N (1 = M, N) pixels;

codes for detecting areas H_1 - H_m (1 = m) <u>in which any of bit information 0 and 1 is not embedded</u><s>in which information is not embedded</s>, from said plurality of areas S;

codes for recognizing a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out based on locations of said detected areas H_1 - H_m (1 = m) on said image data; and

a computer readable storage medium for holding the codes.

14. (currently amended) A program product for making a computer execute a method of extracting digital watermark information b_1 - b_n (2 = n), <u>a bit value of the digital watermark information being 0 or 1,</u> from image data in which said digital watermark information is embedded, comprising:

codes for dividing the image data into a plurality of areas S each consisting of M × N (1 = M, N) pixels;

codes for detecting areas H_1 - H_m (2 = m) <u>in which any of bit information 0 and 1 is not embedded</u><s>in which information is not embedded</s>, from said plurality of areas S codes for recognizing a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S. said plurality of areas G being located on said image data, and said recognition being carried out based on locations of said detected areas H_1 - H_m

(1 = m) on said image data;

codes for extracting, in each of the plurality of areas G recognized, information p_1 - p_k (1 = k) from areas J_1 - J_k in which said information p_1 - p_k (1 = k) should be embedded, said information p_1 - p_k specifying an embedding format for embedding said digital watermark information b_1 - b_n respectively in said areas T_1 - T_n;

codes for recognizing the embedding format of the digital watermark information b_1 - b_n in the areas T_1 - T_n in the area G in question;

codes for extracting the digital watermark information b_1 - b_n from the areas T_1 - T_n, according to the recognized embedding format; and

a computer readable storage medium for holding the codes.

15. (original) The program product according to Claim 14, further comprising:

codes for extracting, for each of the plurality of groups G recognized, the information p_1 - p_k embedded in the areas J_1 - J_k, to recognize a pattern of increasing/decreasing directions of pixel data values for a bit value of the digital watermark information, in the area G in question, and to detect each bit value of the digital watermark information b_1 - b_n embedded in the areas T_1 - T_n according to the recognized pattern of increasing/decreasing directions.

16. (original) The program product according to Claim 13, further comprising:

codes for detecting a plurality of areas H from each of the areas G;

codes for comparing the detected areas H with an embedding pattern for the

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areas H, said embedding pattern being determined in advance such that the areas H become asymmetric in vertical and horizontal directions in the area G in question; and

codes for judging contents of image processing carried out on the image data.

17. (currently amended) An apparatus for embedding digital watermark information $b_1 - b_n$ ($2 = n$) in image data, comprising:

a processing part for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 = M, N$) pixels;

a processing part for defining a plurality of areas G each consisting of $P \times Q$ ($1 = P, Q$) of the areas S;

a processing part for allocating each of the areas S constituting each area G to some one of: areas $T_1 - T_n$ in which said digital watermark information $b_1 - b_n$, a bit value of the digital watermark information being 0 or 1, is respectively embedded and areas $H_1 - H_m$ ($1 = m$) in which any of bit information 0 and 1 is not embedded in which information is not embedded;

a processing part for locating one or more areas T and one or more areas H in a predetermined arrangement in each area G; and

a processing part for locating the plurality of areas C in a predetermined rule.

18. (currently amended) An apparatus for embedding digital watermark information $b_1 - b_n$ ($2 = n$) in image data, comprising:

a processing part for dividing the image data into a plurality of areas S each

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consisting of M × N (1 = M, N) pixels;

a processing part for defining a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S;

a processing part for allocating each of the areas S constituting each area G to some one of: areas T_1 - T_n in which said digital watermark information b_1 - b_n , a bit value of the digital watermark information being 0 or 1, is respectively embedded, areas J_1 - J_k (1 = k) in which information p_1 - p_k (1 = k) specifying an embedding format for embedding said digital watermark information b_1 - b_n in said areas T_1 - T_n, and areas H_1 - H_m (1 = m) in which any of bit information 0 and 1 is not embedded in which information is not embedded;

a processing part for locating one or more areas T, one or more areas J, and one or more areas H in a predetermined arrangement in each area G; and

a processing part for locating the plurality of areas G in a predetermined rule.

19. (original) The apparatus for embedding digital watermark information according to Claim 18, further comprising:

a processing part for embedding said digital watermark information b_1 - b_n by increasing or decreasing pixel data values in the corresponding areas T_1 - T_n according to a bit value (0, 1) of each bit of the digital watermark information b_1 - b_n; and

a processing part for embedding said information p_1 - p_k specifying said embedding format such that said information indicates a pattern of respective increasing/decreasing directions in the area T_1 - T_n for a bit value of the digital

watermark information, in each area G to which the areas J_1 - J_k embedded with said information p_1 - p_k belong.

20. (original) The apparatus for embedding digital watermark information according to Claim 17, wherein

each of said areas G includes a plurality of said areas H that have been allocated so as to be asymmetric in vertical and horizontal directions in the area G in question.

21. (currently amended) An apparatus for extracting digital watermark information b_1 - b_n (2 = n), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

a processing part for dividing the image data into a plurality of areas S each consisting of M × N (1 = M, N) pixels;

a processing part for detecting areas H_1 - H_m (1 = m) in which any of bit information 0 and 1 is not embeddedin which information is not embedded, from said plurality of areas S; and

a processing part for recognizing a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out based on locations of said detected areas H_1 - H_m (1 = m) on said image data.

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22. (currently amended) An apparatus for extracting digital watermark information b_1 - b_n (2 = n), a bit value of the digital watermark information being 0 or 1, from image data In which said digital watermark information is embedded, comprising:

a processing part dividing the image data into a plurality of areas S each consisting of M × N (1 = M, N) pixels;

a processing part for detecting areas H_1 - H_m (1 = m) in which any of bit information 0 and 1 is not embedded~~in which information is not embedded~~, from said plurality of areas S;

a processing part for recognizing a plurality of areas G each consisting of P × Q (1 = P, Q) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out based on locations of said detected areas H_1 - H_m (1 = m) on said image data; a processing part for extracting, in each of the plurality of areas G recognized, information p_1 - p_k (1 = k) from areas J_1 - J_k in which said information p_1 - p_k (1 = k) should be embedded, said information p_1 - p_k specifying an embedding format for embedding said digital watermark information b_1 - b_n respectively in said areas T_1 - T_n;

a processing part for recognizing the embedding format of the digital watermark information b_1 - b_n in the areas T_1 - T_n in the area G in question; and

a processing part for extracting the digital watermark information b_1 - b_n from the areas T_1 - T_n, according to the recognized embedding format.

23. (original) The apparatus for extracting digital watermark information

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according to Claim 22, further comprising:

a processing part for extracting, for each of the plurality of groups G recognized, the information p_1 - p_k embedded in the areas J_1 - J_k, to recognize a pattern of increasing/decreasing directions of pixel data values for a bit value of the digital watermark information, in the area G in question, and to detect each bit value of the digital watermark information b_1 - b_n embedded in the areas T_1 - T_n, according to the recognized pattern of increasing/decreasing directions.

24. (original) The apparatus for extracting digital watermark information according to Claim 21, further comprising:

a processing part for detecting a plurality of areas H from each of the areas G; and

a processing part for comparing the detected areas H with an embedding pattern for the areas H, said embedding pattern being determined in advance such that the areas H become asymmetric in vertical and horizontal directions in the area G in question; and

a processing part for judging contents of image processing carried out on the image data.

25. (currently amended) An apparatus for embedding digital watermark information b_1 - b_n ($2 = n$) in image data, comprising:

a processor; and

a storage unit for storing codes for making the processor execute a method of

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embedding the digital watermark information; wherein:

said codes comprises:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ ($1 = M, N$) pixels;

codes for defining a plurality of areas G each consisting of $P \times Q$ ($1 = P, Q$) of the areas S;

codes for allocating each of the areas S constituting each area G to some one of: areas T_1 - T_n in which said digital watermark information b_1 - b_n , a bit value of the digital watermark information being 0 or 1, is respectively embedded, areas J_1 - J_k, ($1 = k$) in which information P_1 - P_k ($1 = k$) specifying a embedding format for embedding said digital watermark information b_1 - b_n in said areas T_1 - T_n, and areas H_1 - H_m ($1 = m$) in which any of bit information 0 and 1 is not embedded~~in which information is not embedded~~;

codes for locating one or more areas T, one or more areas J, and one or more areas H in a predetermined arrangement in each area G; and

codes for locating the plurality of areas G in a predetermined rule.

26. (currently amended) An apparatus for extracting digital watermark information b_1 - b_n ($2 = n$), a bit value of the digital watermark information being 0 or 1, from image data in which said digital watermark information is embedded, comprising:

a processor; and

a storage unit for storing codes for making the processor execute a method of

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extracting the digital watermark information; wherein:

said codes comprises:

codes for dividing the image data into a plurality of areas S each consisting of $M \times N$ (1 = M, N) pixels;

codes for detecting areas H_1 - H_m (1 = m) in which any of bit information 0 and 1 is not embedded~~in which information is not embedded~~, from said plurality of areas S;

codes for recognizing a plurality of areas G each consisting of $P \times Q$ (1 = P, Q) of the areas S, said plurality of areas G being located on said image data, and said recognition being carried out based on locations of said detected areas H_1 - Hm (1 = m) on said image data; and codes for extracting, in each of the plurality of areas G recognized, information p_1 - p_k (1 = k) from areas J_1 - J_k in which said information p_1 - p_k (1 = k) should be embedded, said information p_1 - p_k specifying an embedding format for embedding said digital watermark information b_1 - b_n respectively in said areas T_1 - T_n.

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